

REMARKS

Claims 36-41, 44-46, 57-62, and 65-84 are now presented for examination. Claims 38-41, 45, 46, 59-62, 66 and 67 have been cancelled without prejudice or disclaimer of subject matter. Claims 36 and 57 have been amended to define still more clearly what Applicant regards as his invention, in terms which distinguish over the art of record. Claims 68-84 have been added to assure Applicant of the full measure of protection to which he deems himself entitled. Claims 36, 57, 68, 74 and 78 are the only independent claims.

Claims 36, 37, 44, 57, 58 and 65 have been rejected under 35 U.S.C. § 112, first paragraph in that the phrase "wherein apertures of the adjacent. . . with an angle other than zero degree and 180 degrees" in claims 36 and 57 lack adequate support in the specification and does not enable one skilled in the art to make and/or use the invention also have been rejected 35 U.S.C. § 112, second paragraph, as being indefinite.

As currently amended, Claim 36 includes the limitation of "apertures of the adjacent two separating portions are disposed at rotational positions, about an optical axis of said optical system defined substantially as an angle of 90 degrees" and Claim 57 as currently amended includes the limitation of "a relative rotational position of said first and second apertures about an optical axis of said exposure apparatus substantially defines an angle of 90 degrees" which limitations believed to clearly define the invention. The features of Claims 36 and 57 with respect to the first and second apertures are clearly shown in Figs. 2 and 3 and are disclosed in the corresponding portions of the specification. Accordingly, it believed that all the limitations of Claims 36 and 57 are shown in the drawings and disclosed in the specification as filed. No new matter is believed to have been added. It is therefore believed that Claims 36, 37, 44, 57, 58

and 65 fully meet the requirements of 35 U.S.C. § 112, first and second paragraphs.

Claims 36-41, 44-46, 57-62 and 65-67 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 4,690,528 (Tanimoto et al.). With regard to the claims as currently amended, this rejection is respectfully traversed in view of the following.

Independent Claim 36 as currently amended is directed to an exposure apparatus in which an optical system has plural spaces separated by plural separating portions. Each separating portion includes an optical element and a supporting portion that supports the optical element. Each of two adjacent separating portions of the plural separating portions has an aperture through which gas can be transmitted. Apertures of the adjacent two separating portions are disposed at rotational positions about an optical axis of the optical system defined substantially as an angle of 90 degrees.

Independent Claim 57 as currently amended is directed to exposure apparatus in which first separating portion separates a first space and a second space from each other. The first separating portion has a first aperture. A second separating portion separates the second space and a third space from each other. The second separating portion has a second aperture. A supplying unit supplies a gas to one of the first and third spaces. The relative rotational position of the first and second apertures about the optical axis of the exposure apparatus substantially defines an angle of 90 degrees.

In Applicant's opinion, Tanimoto et al. discloses a projection exposure apparatus used to project a minute pattern formed on a photomask or reticle onto a semiconductive wafer that has a stabilized image-forming performance. In the apparatus, a projection lens system includes a plurality number of lens elements spaced apart from each other. A supply unit

supplies a gas flow to at least one of spaces through which the gas passes and an isolating unit isolates the space(s) supplied with gas from atmosphere. A changing unit changes the refractive index of the isolated space(s).

According to the invention defined in Claim 36, the rotational positions of apertures of adjacent separating portions are disposed about the optical axis of an optical system defined substantially as a 90 degree angle. In Claim 57, the relative rotational position of first and second apertures about the optical axis of an exposure system substantially defines an angle of 90 degrees. Tanimoto et al. may teach the use of apertures in optical system separators. The Tanimoto et al. disclosure, however, is devoid of any suggestion of the rotational positions of apertures in separating portions being rotationally positioned about an optical axis substantially at a 90 degree angle as in Claims 36 and 57. It is therefore believed that Claims 36 and 57 as currently amended are completely distinguished from Tanimoto et al. and are allowable.

New independent Claim 68 is directed to exposure apparatus in which an optical system has a first optical element that directs light from a light source to a member to be exposed. The first optical element separates first and second spaces inside the optical system. The first optical element has a first notch formed at an end portion outside the effective light flux of light from the light source. The features of Claim 68 are shown in Figs. 7 and 8 of the drawings as filed and are disclosed in the corresponding portions of the specification.

It is a feature of Claim 68 that an optical element separating first and second spaces inside an optical system has a first notch formed an end potion outside the effective light flux of light from a light source. An example of such a notch at the end of an optical element is shown in Fig. 7 of the drawings. Tanimoto et al. fails in any manner to show or mention in any manner

any type of notch in an optical element but rather requires apertures outside the optical elements. Accordingly, it is not seen that Tanimoto et al. in any way suggests this feature of Claim 68. Crone of record teaches a bore in a mirror to pass light through a portion of the mirror but is devoid of any suggestion of a notch at an end portion of an optical element outside a light flux path as in Claim 68. It is therefore believed that new Claim 68 is completely distinguished from Tanimoto et al. and Crone and is allowable.

New independent Claim 74 is directed to exposure apparatus in which a first separating portion separates a first space and a second space from each other. The first separating portion having a first aperture and a second aperture. A second separating portion separates the second space and a third space from each other. The second separating portion has a third aperture and a fourth aperture. The first aperture, third aperture, the second aperture and the fourth aperture are disposed along the named order with respect to the rotational direction about the optical axis of the exposure apparatus. The features of Claim 74 are shown in Figs. 2 and 3 of the drawings as filed and are disclosed in the corresponding portions of the specification.

It is a feature of Claim 74 that a first aperture in a first separating portion separating first and second spaces, a third aperture in a second separating portion separating second and third spaces, a second aperture in the first separating portion and a fourth aperture in the second separating portion are disposed in that order with respect to the rotational direction about the optical axis of an exposure apparatus. In contrast Tanimoto et al. only uses apertures that are alternately disposed at positions different by about 180 degrees from each other. Accordingly, it is not seen that Tanimoto et al. in any manner teaches or suggests the features of Claim 74.

Accordingly, it is believed that new Claim 74 is completely distinguished from Tanimoto et al. and is allowable.

New independent Claim 78 is directed to exposure apparatus in which an optical system has a first transmission type optical element that directs light from a light source to a member to be exposed. The first transmission type optical element serves to separate first and second spaces inside the optical system. The first transmission type optical element has a first notch. The features of Claim 74 are shown in Figs. 7 and 8 of the drawings as filed and are disclosed in the corresponding portions of the specification.

According to the invention of Claim 78, a transmission type optical element that separates first and second spaces inside an optical system has a first notch. As discussed with respect to Claim 68, Tanimoto et al. is devoid of any teaching or suggestion of an optical element with a notch therein. The Crone reference of record may teach a bore in a mirror to allow light to pass through the mirror. It is not seen that anything in either Tanimoto et al. or Crone's bore in a mirror to pass light could teach or suggest the feature of a notch in a transmission optical element as in Claim 78. It is therefore believed that new Claim 78 is completely distinguished from Tanimoto et al. and the other references of record and is allowable.

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.


The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention,

however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable consideration and reconsideration and early passage to issue of the present application.

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Respectfully submitted,


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